Grade 12 Laboratory Activity – January 11th 2012

This lab period you will be designing and running an experiment. You will collect and process data, run a T-test, and present your findings to the rest of the group.

You will be using hand dynamometers. These are devices used to measure grip strength.

They are connected to the Vernier software and you can collect data for any amount of time you wish.

I will help you use the software to ensure you can collect the data you wish to collect.

The time will be split into 4 stages.

* Planning Stage. Your group will brainstorm an activity that will yield sufficient data that can be processed. You will create a short abstract as to what you will carry out for an activity and how you plan to process and present the data. 30 minutes max.
* Action Stage: Your group will carry out your activity. The activity needs to be completed in 30 minutes so be cognizant of how much time you use. 30 minutes max.
* Data Processing & Poster Board Stage: You will carry out all processing and T-test calculations. You will create a poster that is a shortened version of a full IB lab report. You will have your RQ, Data Table, Processed Data, T-Test result, and Conclusion. 40 minutes max
* Presentation Stage: Each group will present their findings to the class. 20 minutes max

T-Tests :

* T-tests are statistical tests that measure the probability there is no difference between the 2 sets of values.
* Must have sample size of 10 and a normal distribution. (we will assume a normal distribution)
* We will only use 2-tailed, unpaired, t-tests.
* The **null hypothesis** states that the 2 sets of values are NOT statistically different.
* You calculate a P-value.
* If the P-value is greater than 0.05 you accept the null hypothesis that there is NOT a statistical difference between the samples.
* but, if the P-value is less than 0.05, you reject the null hypothesis.
* This can mean there is a statistical difference between the 2 sets of values and further research is likely needed.

Procedure for calculating t-tests today:

* Collect your data and record it in column 1 of a MS Excel document.
* Repeat for your second set of data – place in column 2.
* Click in an empty cell
* Press =
* Press fx
* Find t-test and select it
* Click in array 1
* Highlight data set # 1
* Click in array 2
* Highlight data set # 2
* Click in Tails and type 2
* Click in Type and type 2
* Press enter
* This gives you a value, this is your p-value.
* Is it greater than 0.05?
* If yes – you accept the null hypothesis that there is NO statistical difference between the means
* If no – you reject the null hypothesis, and conclude that there may be a statistical difference between the means.